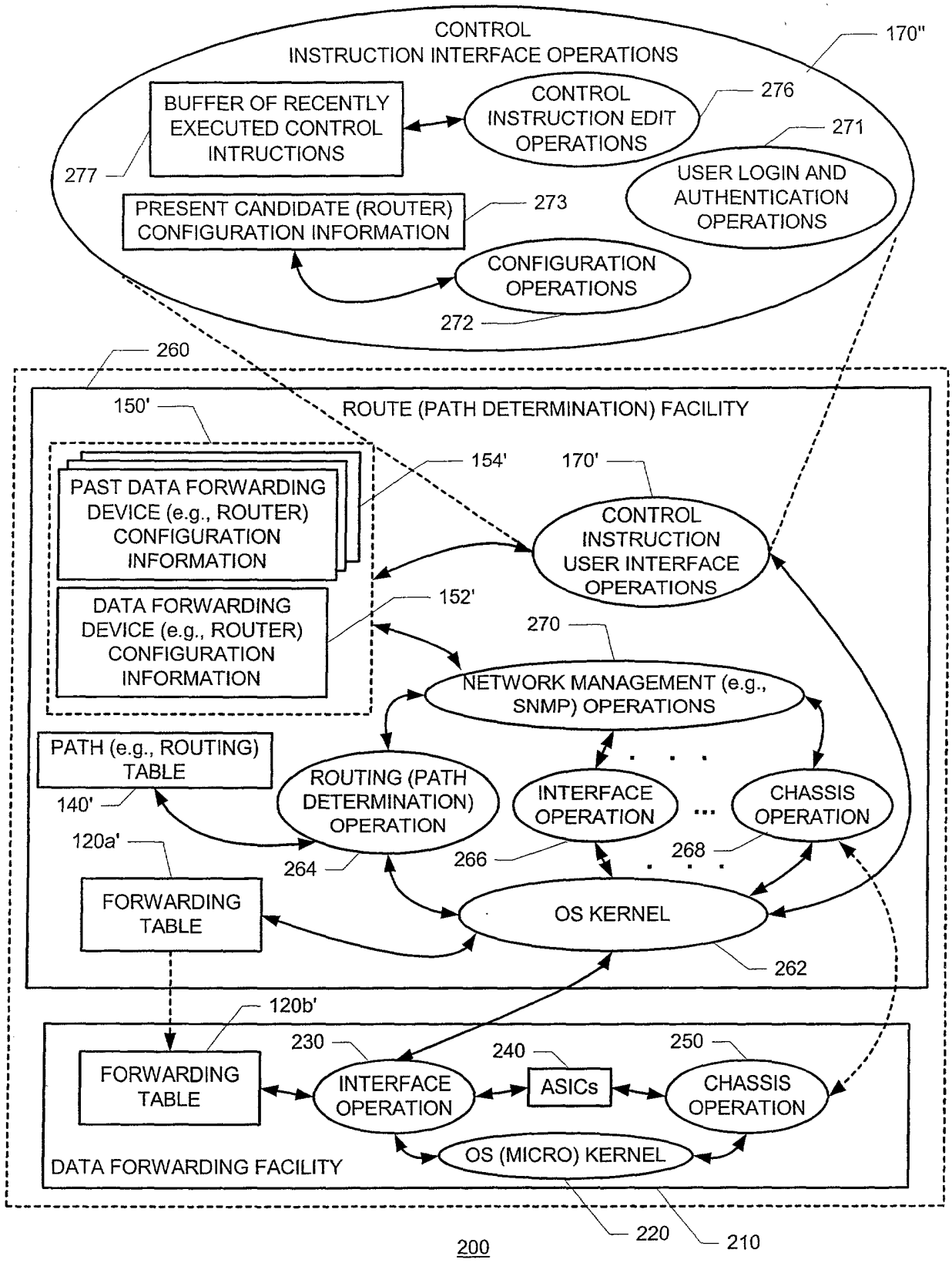

CONTROL
INSTRUCTION INTERFACE OPERATIONS
170"
BUFFER OF RECENTLY EXECUTED CONTROL INTRUCTIONS
277
CONTROL INSTRUCTION EDIT OPERATIONS
276
271
USER LOGIN AND AUTHENTICATION OPERATIONS
PRESENT CANDIDATE (ROUTER) CONFIGURATION INFORMATION
273
CONFIGURATION OPERATIONS
272
260
150'
ROUTE (PATH DETERMINATION) FACILITY
154'
170'
PAST DATA FORWARDING DEVICE (e.g., ROUTER) CONFIGURATION INFORMATION
CONTROL INSTRUCTION USER INTERFACE OPERATIONS
152'
DATA FORWARDING DEVICE (e.g., ROUTER) CONFIGURATION INFORMATION
270
NETWORK MANAGEMENT (e.g., SNMP) OPERATIONS
PATH (e.g., ROUTING) TABLE
140'
ROUTING (PATH DETERMINATION) OPERATION
INTERFACE OPERATION
CHASSIS OPERATION
120a'
264
266
268
FORWARDING TABLE
OS KERNEL
262
120b'
230
240
250
FORWARDING TABLE
INTERFACE OPERATION
ASICs
CHASSIS OPERATION
OS (MICRO) KERNEL
DATA FORWARDING FACILITY
220
210
200

FIGURE 2

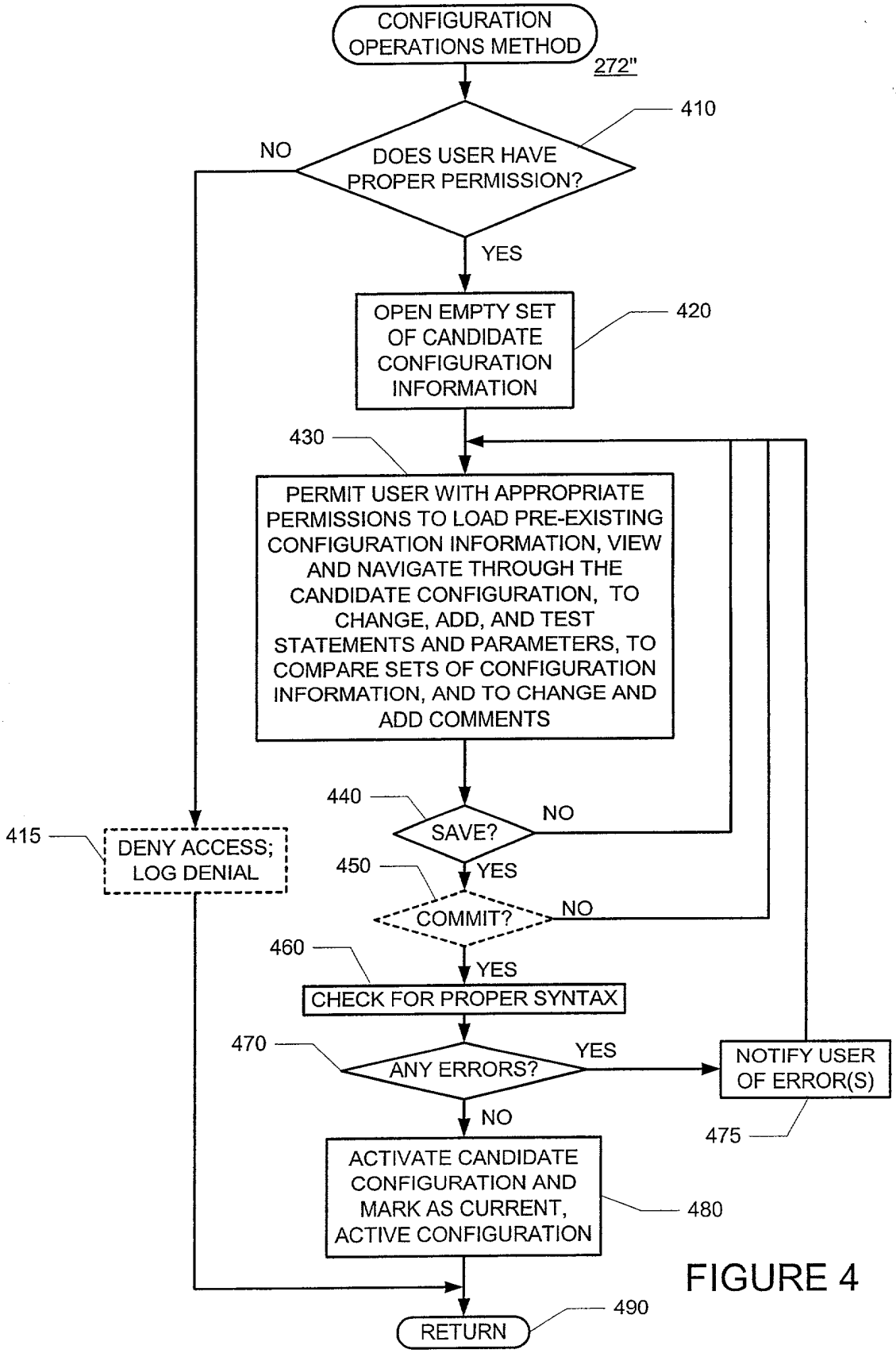
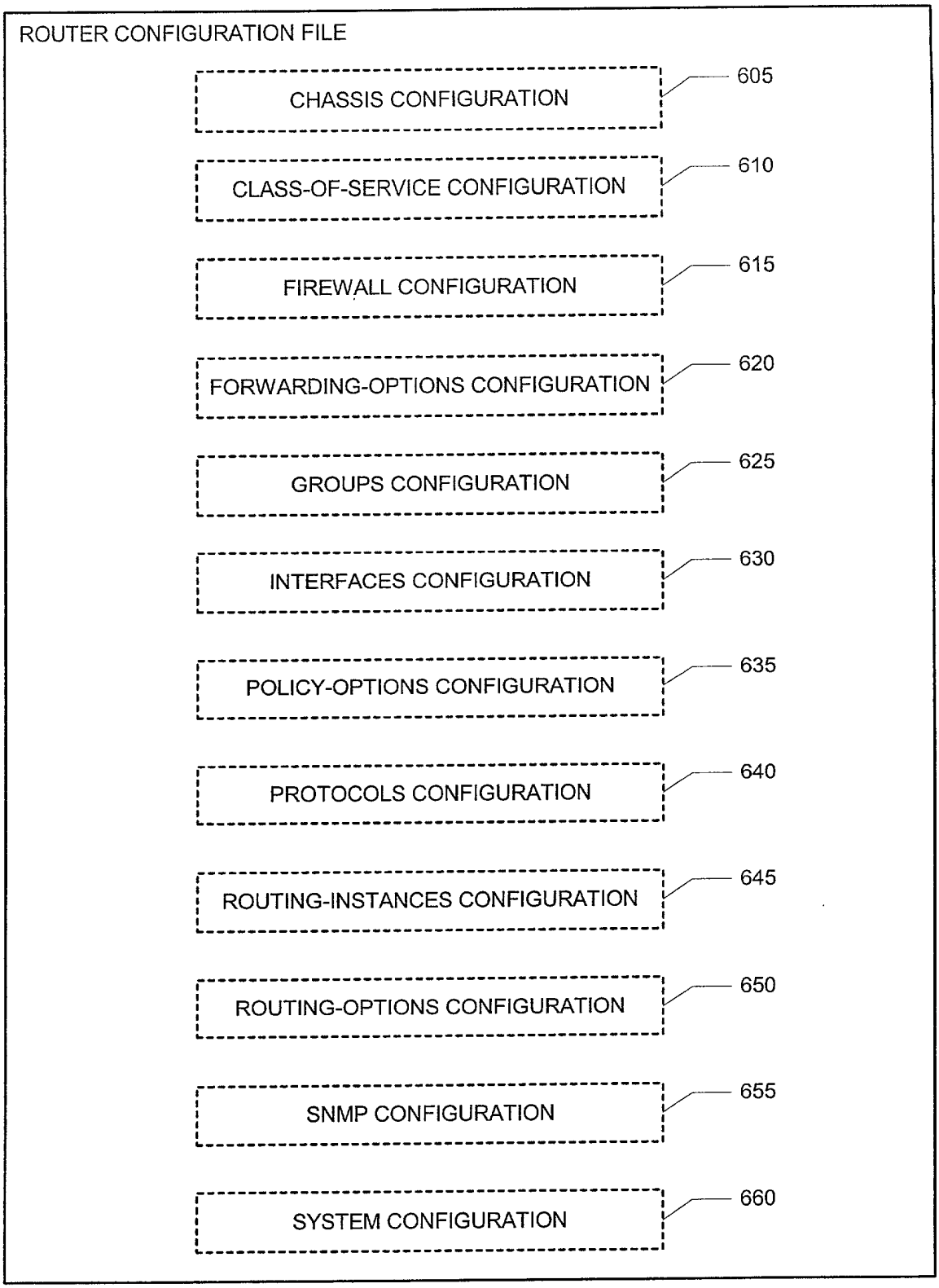


FIGURE 4

Oracle-2015



152"

FIGURE 6

Juniper Exhibit 1004 Page 00054

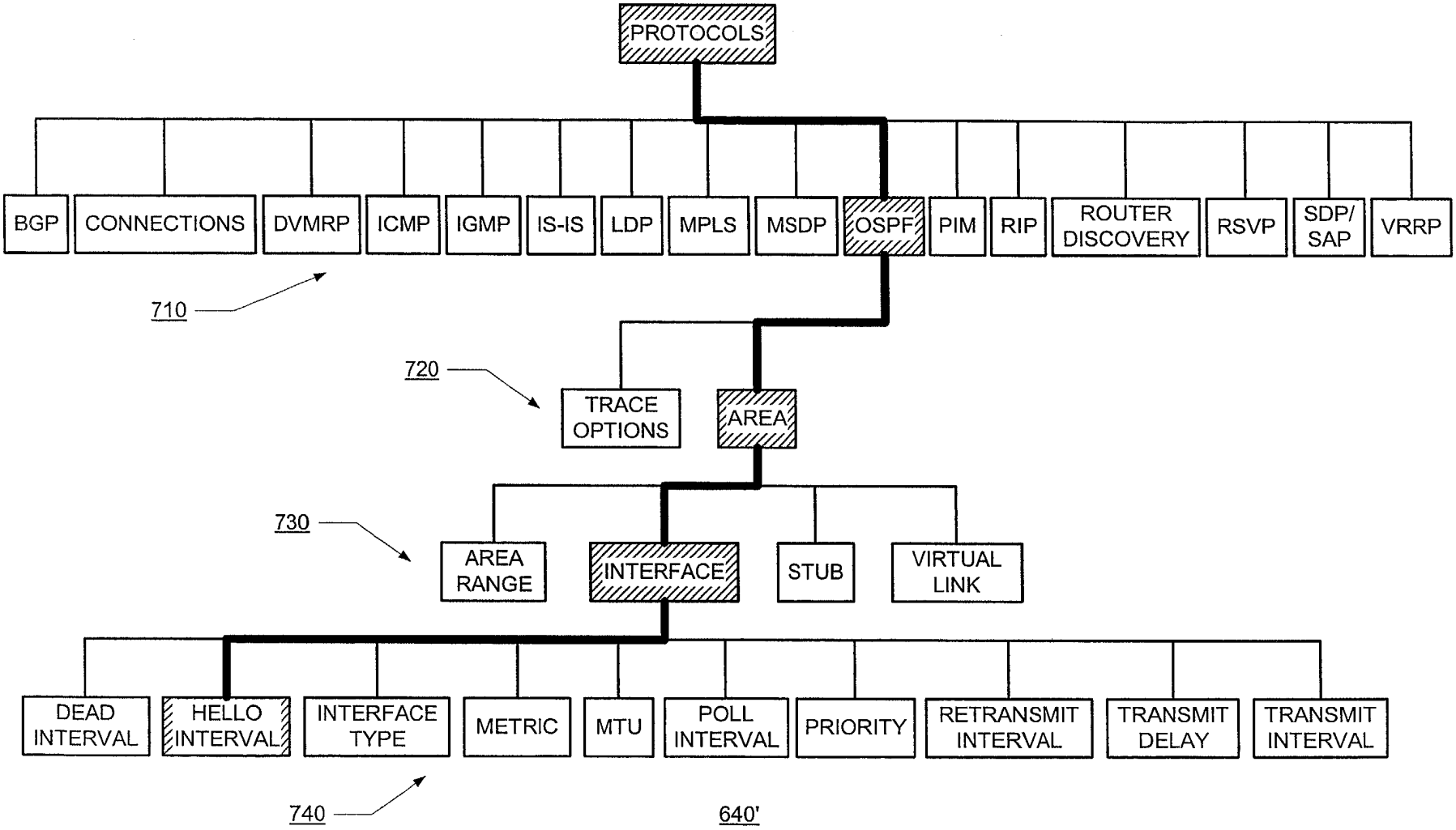

PROTOCOLS
BGP
CONNECTIONS
DVMRP
ICMP
IGMP
IS-IS
LDP
MPLS
MSDP
OSPF
PIM
RIP
ROUTER DISCOVERY
RSVP
SDP/ SAP
VRRP
710
720
TRACE OPTIONS
AREA
730
AREA RANGE
INTERFACE
STUB
VIRTUAL LINK
DEAD INTERVAL
HELLO INTERVAL
INTERFACE TYPE
METRIC
MTU
POLL INTERVAL
PRIORITY
RETRANSMIT INTERVAL
TRANSMIT DELAY
TRANSMIT INTERVAL
740
640'

FIGURE 7

[edit class-of-service] Hierarchy Level

```
class-of-service {
  input {
    fpc fpc-number {
      precedence-map map-name;
    }
    interfaces {
      interface-name {
        inet-precedence-map;
        mpls-cos-map;
        unit unit-number {
          output-queue queue-number;
        }
      }
    }
    precedence-map map-name {
      bits precedence-bit output-queue queue-number;
    }
  }
  output {
    drop-profile profile-name {
      stream-profile {
        fill-level fill-percentage drop-probability probability-percentage;
      }
      plp-set-queue-profile {
        fill-level fill-percentage drop-probability probability-percentage;
      }
      plp-clear-queue-profile {
        fill-level fill-percentage drop-probability probability-percentage;
      }
    }
    fpc fpc-number {
      drop-profile profile-name;
    }
    interfaces {
      interface-name {
        transmit-queues {
          output-queue queue-number bandwidth percentage;
        }
        weighted-round-robin {
          output-queue queue-number weight percentage;
        }
        unit unit-number {
          precedence-rewrite {
            output-queue queue-number {
              plp-clear rewrite-bits precedence-bit;
              plp-set rewrite-bits precedence-bit;
            }
          }
        }
      }
    }
  }
  policy {
    class class-name {
      classification-override {
        output-queue queue-number;
      }
    }
  }
} # End of [edit class-of-service] hierarchy level
```

FIGURE 9

```
    sonet-options {
      aps {
        advertise-interval milliseconds;
        authentication-key key;
        force;
        hold-time milliseconds;
        lockout;
        neighbor address;
        paired-group group-name;
        protect-circuit group-name;
        request;
        revert-time seconds;
        working-circuit group-name;
      }
      bytes {
        e1-quiet value;
        f1 value;
        f2 value;
        s1 value;
        z3 value;
        z4 value;
      }
      fcs (32 | 16);
      loopback (local | remote);
      path-trace trace-string;
      (payload-scrambler | no-payload-scrambler);
      rfc-2615;
      (z0-increment | no-z0-increment);
    }
    speed (10m | 100m);
    t1-options {
      buildout (0-133 | 133-266 | 266-399 | 399-532 | 532-655);
      byte-encoding (nx64 | nx56);
      fcs (32 | 16);
      framing (sf | esf);
      idle-cycle-flags (flags | ones);
      invert-data;
      line-encoding (ami | b8zs);
      loopback (local | remote);
      start-end-flag (shared | filler);
      timeslots slot-number;
    }
    t3-options {
      bert-algorithm algorithm;
      bert-error-rate rate;
      bert-period seconds;
      (cbit-parity | no-cbit-parity);
      compatibility-mode (digital-link | kentrox | larscom) <subrate value>;
      fcs (32 | 16);
      (feac-loop-respond | no-feac-loop-respond);
      idle-cycle-flag value;
      (long-buildout | no-long-buildout);
      loopback (local | remote);
      (payload-scrambler | no-payload-scrambler);
      start-end-flag value;
    }
    traceoptions {
      flag flag <flag-modifier> <disable>;
    }
    transmit-bucket {
      overflow (tag | discard);
      rate speed;
```

FIGURE 13b

```
        lsp-lifetime seconds;
        no-authentication-check;
        overload <timeout seconds>;
        reference-bandwidth reference-bandwidth;
        traffic-engineering {
          disable;
          shortcuts;
        }
        traceoptions {
          file name <replace> <size size> <files number> <no-stamp>
            <(world-readable | no-world-readable)>;
          flag flag <flag-modifier> <disable>;
        }
        interface interface-name {
          disable;
          csnp-interval seconds;
          hello-authentication-key key;
          hello-authentication-type authentication;
          lsp-interval milliseconds;
          mesh-group (value | blocked);
          passive;
          level level-number {
            disable;
            hello-authentication-key key;
            hello-authentication-type authentication;
            hello-interval seconds;
            hold-time seconds;
            metric metric;
            passive;
            priority priority;
            te-metric metric;
          }
        }
      }  # End of [edit protocols isis] hierarchy level

LDP   ldp {
        interface interface-name {
          disable;
          hello-interval seconds;
          hold-time seconds;
        }
        keepalive-interval seconds;
        keepalive-timeout seconds;
        preference preference;
        traceoptions {
          file name <replace> <size size> <files number> <no-stamp>
            <(world-readable | no-world-readable)>;
          flag flag <flag-modifier> <disable>;
        }
      }  # End of [edit protocols ldp] hierarchy level

MPLS  mpls {
        disable;
        no-propagate-ttl;
        admin-groups {
          group-name group-value;
        }
        log-updown {
          (syslog | no-syslog);
          (trap | no-trap);
        }
```

FIGURE 15e

Juniper Exhibit 1003 Page 0054

```
            flag flag <flag-modifier> <disable>;
          }
        }
        group group-name {
          disable;
          export [ policy-names ];
          import [ policy-names ];
          local-address address;
          traceoptions {
            file name <replace> <size size> <files number> <no-stamp>
              <(world-readable | no-world-readable)>;
            flag flag <flag-modifier> <disable>;
          }
          peer address; {
            disable;
            export [ policy-names ];
            import [ policy-names ];
            local-address address;
            mode <(mesh-group | standard)>;
            traceoptions {
              file name <replace> <size size> <files number> <no-stamp>
                <(world-readable | no-world-readable)>;
              flag flag <flag-modifier> <disable>;
            }
          }
        }
      } #End of [edit protocols msdp] hierarchy level

OSPF  ospf {
        disable;
        export [ policy-names ];
        external-preference preference;
        preference preference;
        reference-bandwidth reference-bandwidth;
        traffic-engineering {
          no-topology;
          shortcuts;
        }
        traceoptions {
          file name <replace> <size size> <files number> <no-stamp>
            <(world-readable | no-world-readable)>;
          flag flag <flag-modifier> <disable>;
        }
        area area-id {
          area-range network/masklen <restrict>;
          authentication-type authentication;
          interface interface-name {
            disable;
            authentication-key key <key-id identifier>;
            dead-interval seconds;
            hello-interval seconds;
            interface-type type;
            metric metric;
            neighbor address <eligible>;
            passive;
            poll-interval seconds;
            priority priority;
            retransmit-interval seconds;
            transit-delay seconds;
            transmit-interval seconds;
          }
```

FIGURE 15h

Juniper Exhibit 1004 - Page 274

```
        flag flag <flag-modifier> <disable>;
      }
      authentication-key password;
      authentication-type type;
      (check-zero | no-check-zero);
      import [policy];
      message-size number;
      metric-in metric;
      receive receive-options;
      send send-options;
      group group-name {
        export [policy];
        metric-out metric;
        preference preference;
        neighbor neighbor-name {
          authentication-key password;
          authentication-type type;
          (check-zero | no-check-zero);
          import [policy];
          message-size number;
          metric-in metric;
          receive receive-options;
          send send-options;
        }
      }
    } # End of [edit protocols rip] hierarchy level
```

Router Discovery

```
router-discovery {
  disable;
  traceoptions {
    file name <replace> <size size> <files number> <no-stamp>
      <(world-readable | no-world-readable)>;
    flag flag <flag-modifier> <disable>;
  }
  interface interface-name {
    min-advertisement-interval seconds;
    max-advertisement-interval seconds;
    lifetime seconds;
  }
  address address {
    (advertise | ignore);
    (broadcast | multicast);
    (priority priority | ineligible);
  }
} # End of [edit protocols router-discovery] hierarchy level
```

RSVP

```
rsvp {
  disable;
  keep-multiplier number;
  refresh-time seconds;
  traceoptions {
    file name <replace> <size size> <files number> <no-stamp>
      <(world-readable | no-world-readable)>;
    flag flag <flag-modifier> <disable>;
  }
  interface interface-name {
    disable;
    (aggregate | no-aggregate);
    authentication-key key;
    bandwidth bps;
```

FIGURE 15j

Juniper Exhibit 1002 - Page 0

[edit routing-options] Hierarchy Level

```
routing-options {
   aggregate {
      defaults {
         (active | passive);
         as-path <as-path> <origin (egp | igp | incomplete | none)> <atomic-aggregate>
            <aggregator as-number in-address>;
         community ([ community-ids ] | no-advertise | no-export | no-export-subconfed | none);
         (full | brief);
         (metric | metric2 | metric3 | metric4) value;
         (preference | preference2 | color | color2) preference;
         (tag | tag2) string;
      }
      route destination-prefix {
         policy policy-name;
         (active | passive);
         as-path <as-path> <origin (egp | igp | incomplete | none)> <atomic-aggregate>
            <aggregator as-number in-address>;
         community ([ community-ids ] | no-advertise | no-export | no-export-subconfed | none);
         (full | brief);
         (metric | metric2 | metric3 | metric4) value;
         (preference | preference2 | color | color2) preference;
         (tag | tag2) string;
      }
   }
   autonomous-system autonomous-system <loops number>;
   confederation confederation-autonomous-system  members autonomous-system;
   forwarding-table {
      export [ policy-names ];
   }
   generate {
      defaults {
         (active | passive);
         as-path <as-path> <origin (egp | igp | incomplete | none)> <atomic-aggregate>
            <aggregator as-number in-address>;
         community ([ community-ids ] | no-advertise | no-export | no-export-subconfed | none);
         (full | brief);
         (metric | metric2 | metric3 | metric4) value;
         (preference | preference2 | color | color2) preference;
         (tag | tag2) string;
      }
      route destination-prefix {
         policy policy-name;
         (active | passive);
         as-path <as-path> <origin (egp | igp | incomplete | none)> <atomic-aggregate>
            <aggregator as-number in-address>;
         community ([ community-ids ] | no-advertise | no-export | no-export-subconfed | none);
         (full | brief);
         (metric | metric2 | metric3 | metric4) value;
         (preference | preference2 | color | color2) preference;
         (tag | tag2) string;
      }
   }
   interface-routes {
      rib-group routing-table-name;
   }
   martians {
      destination-prefix match-type <allow>;
   }
```

FIGURE 17a

```
multicast {
   scope scope-name {
      interface interface-name;
      prefix destination-prefix;
   }
}
options {
   syslog (level level | upto level);
}
rib routing-table {
   static {
      defaults {
         (active | passive);
         as-path <as-path> <origin (egp | igp | incomplete | none)> <atomic-aggregate>
            <aggregator as-number in-address>;
         community ([ community-ids ] | no-advertise | no-export | no-export-subconfed | none);
         (install | no-install);
         (metric | metric2 | metric3 | metric4) value;
         (preference | preference2 | color | color2) preference;
         (readvertise | no-readvertise);
         (no-retain | retain);
         (tag | tag2) string;
      }
      route destination-prefix {
         next-hop;
         (active | passive);
         as-path <as-path> <origin (egp | igp | incomplete | none)> <atomic-aggregate>
            <aggregator as-number in-address>;
         community ([ community-ids ] | no-advertise | no-export | no-export-subconfed | none);
         (install | no-install);
         (metric | metric2 | metric3 | metric4) value;
         (preference | preference2 | color | color2) preference;
         (readvertise | no-readvertise);
         (no-retain | retain);
         (tag | tag2) string;
      }
   aggregate {
      defaults {
         (active | passive);
         as-path <as-path> <origin (egp | igp | incomplete | none)> <atomic-aggregate>
            <aggregator as-number in-address>;
         community ([ community-ids ] | no-advertise | no-export | no-export-subconfed | none);
         (full | brief);
         (metric | metric2 | metric3 | metric4) value;
         (preference | preference2 | color | color2) preference;
         (tag | tag2) string;
      }
      route destination-prefix {
         policy policy-name;
         (active | passive);
         as-path <as-path> <origin (egp | igp | incomplete | none)> <atomic-aggregate>
            <aggregator as-number in-address>;
         community ([ community-ids ] | no-advertise | no-export | no-export-subconfed | none);
         (full | brief);
         (metric | metric2 | metric3 | metric4) value;
         (preference | preference2 | color | color2) preference;
         (tag | tag2) string;
      }
```

FIGURE 17b

```
        generate {
          defaults {
            (active | passive);
            as-path <as-path> <origin (egp | igp | incomplete | none)> <atomic-aggregate>
              <aggregator as-number in-address>;
            community ([ community-ids ] | no-advertise | no-export | no-export-subconfed | none);
            (full | brief);
            (metric | metric2 | metric3 | metric4) value;
            (preference | preference2 | color | color2) preference;
            (tag | tag2) string;
          }
          route destination-prefix {
            policy policy-name;
            (active | passive);
            as-path <as-path> <origin (egp | igp | incomplete | none)> <atomic-aggregate>
              <aggregator as-number in-address>;
            community ([ community-ids ] | no-advertise | no-export | no-export-subconfed | none);
            (full | brief);
            (metric | metric2 | metric3 | metric4) value;
            (preference | preference2 | color | color2) preference;
            (tag | tag2) string;
          }
        }
        martians {
          destination-prefix match-type <allow>;
        }
      }
      rib-groups {
        group-name {
          import-rib [ group-name ];
          export-rib group-name;
        }
      }
      router-id address;
      static {
        defaults {
          (active | passive);
          as-path <as-path> <origin (egp | igp | incomplete | none)> <atomic-aggregate>
            <aggregator as-number in-address>;
          community ([ community-ids ] | no-advertise | no-export | no-export-subconfed | none);
          (install | no-install);
          (metric | metric2 | metric3 | metric4) value;
          (preference | preference2 | color | color2) preference;
          (readvertise | no-readvertise);
          (no-retain | retain);
          (tag | tag2) string;
        }
        route destination-prefix {
          next-hop;
          (active | passive);
          as-path <as-path> <origin (egp | igp | incomplete | none)> <atomic-aggregate>
            <aggregator as-number in-address>;
          community ([ community-ids ] | no-advertise | no-export | no-export-subconfed | none);
          (install | no-install);
          (metric | metric2 | metric3 | metric4) value;
          (preference | preference2 | color | color2) preference;
          (readvertise | no-readvertise);
          (no-retain | retain);
          (tag | tag2) string;
        }
      }
      traceoptions {
        file name <replace> <size size> <files number> <no-stamp>
          <(world-readable | no-world-readable)>;
        flag flag <flag-modifier> <disable>;
      }
    } # End of [edit routing-options] hierarchy level
```

FIGURE 17c

[edit system] Hierarchy Level

```
system {
    authentication-order [ authentication-methods ];
    backup-router address <destination destination-address>;
    compress-configuration-files;
    default-address-selection;
    dhcp-relay (server address | disable);
    diag-port-authentication (encrypted-password "password" | plain-text-password);
    domain-name domain-name;
    domain-search [domain-list];
    host-name host-name;
    location {
        altitude feet;
        country-code code;
        hcoord horizontal-coordinate;
        lata service-area;
        latitude degrees;
        longitude degrees;
        npa-nxx number;
        postal-code postal-code;
        vcoord vertical-coordinate;
    }
    login {
        message text;
        class class-name {
            allow-commands "regular-expression";
            deny-commands "regular-expression";
            idle-timeout minutes;
            permissions [ permissions ];
        }
        user user-name {
            full-name complete-name;
            uid uid-value;
            class class-name;
            authentication {
                (encrypted-password "password" | plain-text-password);
                ssh-rsa "public-key";
            }
        }
    }
    name-server {
        address;
    }
    no-redirects;
    ntp {
        authentication-key key-number type type value password;
        boot-server address;
        broadcast <address> <key key-number> <version value> <ttl value>;
        broadcast-client;
        multicast-client <address>;
        peer address <key key-number> <version value> <prefer>;
        server address <key key-number> <version value> <prefer>;
        trusted-key [ key-numbers ];
    }
    ports {
        auxiliary {
            insecure;
            speed baud-rate;
            type terminal-type;
        }
        console {
            insecure;
            speed baud-rate;
            type terminal-type;
```

FIGURE 19a

Juniper Exhibit 1003

```
        }
      }
      processes {
        inet-process (enable | disable);
        interface-control (enable | disable);
        mib-process (enable | disable);
        ntp (enable | disable);
        routing (enable | disable);
        snmp (enable | disable);
        watchdog (enable | disable) <timeout seconds>;
      }
      radius-server server-address {
        port number;
        retry number;
        secret password;
        timeout seconds;
      }
      root-authentication {
        (encrypted-password "password" | plain-text-password);
        ssh-rsa "public-key";
      }
      services {
        finger <connection-limit limit> <rate-limit limit>;
        ssh <connection-limit limit> <rate-limit limit>;
        telnet <connection-limit limit> <rate-limit limit>;
      }
      static-host-mapping {
        host-name {
          inet [ address ];
          sysid system-identifier;
          alias [ alias ];
        }
      }
      syslog {
        file filename {
          facility level;
          archive {
            files number;
            size size;
            (world-readable | no-world-readable);
          }
        }
        host hostname {
          facility level;
          facility-override facility;
          log-prefix string;
        }
        user (username | *) {
          facility level;
        }
        console {
          facility level;
        }
        archive {
          files number;
          size size;
          (world-readable | no-world-readable);
        }
      }
      tacplus-server server-address {
        secret password;
        single-connection;
        timeout seconds;
      }
      time-zone time-zone;
}} # End of [edit system] hierarchy level
```

FIGURE 19b

Juniper Exhibit 1002 Page 1 of 2